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AGILENT TECHNOLOGIES, INC.
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Intellectual Property Administration
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EXAMINER

RAO, ANAND SHASHIKANT

ART UNIT	PAPER NUMBER
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2621

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/725,175	Applicant(s) BAER, RICHARD L.	
	Examiner Andy S. Rao	Art Unit 2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

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DETAILED ACTION

Specification

1. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

2. The disclosure is objected to because of the following informalities:

A). Specification, page 9, lines 5-17, the "illumination source" is referred to as element 50, as in figure 2. However, it is noted that in the figure, the numbering of the element is actually 200, and that 50 actually corresponds the region of interest sections of figure 1.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002

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do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claim 17 is rejected under 35 U.S.C. 102(e) as being anticipated by Neubauer et al., (hereinafter referred to as "Neubauer").

Neubauer discloses an optical inspection system (Neubauer: figure 5), comprising: a camera including an image sensor for capturing an image of a target surface having two or more region of interest segments (Neubauer: column 7, lines 35-45) within the field-of-view of the camera and producing image data corresponding to the image (Neubauer: column 3, lines 55-60); and an image processing system connected to the camera to receive and process only the image data associated with the region of interest segments (Neubauer: column 3, lines 61-67), as in claim 17.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-4, 7-8, and 11-16, 18-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Neubauer et al., (hereinafter referred to as "Neubauer").

Neubauer discloses a camera (Neubauer: figure 5), comprising: an image sensor including pixels for capturing an image (Neubauer: column 3, lines 55-57) having two or more region of interest segments and producing image data corresponding to the image (Neubauer: column 3, lines 58-63); a memory storing selected ones of the pixels located in the region of interest segments within the image (Neubauer: column 3, lines 64-67); and an access controller configured to retrieve the image data associated with the selected pixels (Neubauer: column 4, lines 1-3), as in claim 1. However, Neubauer doesn't explicitly disclose the use of an ROI map as in the claims. But Neubauer discloses the use of ROI template generation based (Neubauer: column 4, lines 4-28) on ROI histograms (Neubauer: column 4, lines 60-67; column 5, lines 1-46) constructed from PCB marker identification (Neubauer: column 4, lines 37-50) in order to accurately predict and classify irregularly shaped PCB features with optimal results (Neubauer: column 7, lines 15-23), especially since the ROI histograms are evaluated on a global scale in accordance with Euclidean distance parameters corresponding to each respective marker (Neubauer: column 7, lines 55-67; column 8, lines 1-27). Accordingly, given the teaching of the Neubauer ROI histograms, it would have been obvious for one of ordinary skill in the art at the time of the invention to associate the ROI histograms of Neubauer with the claimed ROI maps of the instant invention in order to use said map associated ROI histograms to accurately predict and classify irregularly shaped PCB features with optimal results, especially since both would contain the spatial distribution of PCB markers across a field of view of the camera (Neubauer: column 7, lines 35-47). The Neubauer system, now incorporate the map associated ROI histograms as discussed above, has all of the features of claim 1.

Regarding claim 2, the Neubauer system, now incorporate the map associated ROI histograms as discussed above, has an additional memory for storing the image data corresponding to the image, said access controller being configured to access said additional memory to retrieve the image data associated with the selected pixels (Neubauer: column 3, lines 55-67), as in the claim.

Regarding claims 3-4, the Neubauer system, now incorporate the map associated ROI histograms as discussed above, has wherein the plurality of pixels are arranged in rows and columns within a pixel array (Neubauer: column 5, lines 52-67; column 6, lines 1-28), as in the claims

Regarding claims 7-8, the Neubauer system, now incorporate the map associated ROI histograms as discussed above, has wherein said selected pixels correspond to individual ones of the pixels within the pixel array, said access controller being configured to read the image data associated with the selected pixels out of the image sensor pixel-by-pixel (Neubauer: column 8, lines 12-26), as in the claims.

Regarding claim 11, the Neubauer system, now incorporate the map associated ROI histograms as discussed above, has wherein the map includes coordinates of the selected pixels within the pixel array (Neubauer: column 5, lines 30-46), as in the claim.

Regarding claim 12, the Neubauer system, now incorporate the map associated ROI histograms as discussed above, has wherein the map is a bit-wise map of the pixel array (Neubauer: column 8, lines 13-27), as in the claim.

Regarding claim 13, the Neubauer system, now incorporate the map associated ROI histograms as discussed above, has wherein the map is a reduced resolution bit-wise map of the pixel array (Neubauer: column 5, lines 63-67; column 6, lines 1-29), as in the claim.

Regarding claim 14, the Neubauer system, now incorporate the map associated ROI histograms as discussed above, has wherein the region of interest segments correspond to blocks of pixels each having four corner pixels and the map includes coordinates of two of the corner pixels for each of the blocks of pixels (Neubauer: figure 10b), as in the claim.

Regarding claim 15, the Neubauer system, now incorporate the map associated ROI histograms as discussed above, has wherein the region of interest segments correspond to blocks of pixels each having four corner pixels and the map includes coordinates of one of the corner pixels for each of the blocks of pixels and dimensions of each of the blocks of pixels (Neubauer: figure 10b), as in the claim.

Regarding claim 16, the Neubauer system, now incorporate the map associated ROI histograms as discussed above, has wherein the region of interest segments correspond to blocks of pixels each having four reduced resolution corner pixels and the map includes coordinates of two of the reduced resolution corner pixels for each of the blocks of pixels (Neubauer: column 5, lines 63-67; column 6, lines 1-29), as in the claim.

Neubauer discloses an optical inspection system (Neubauer: figure 5), comprising: a camera including an image sensor for capturing an image of a target surface having two or more region of interest segments (Neubauer: column 7, lines 35-45) within the field-of-view of the camera and producing image data corresponding to the image (Neubauer: column 3, lines 55-60); and an image processing system connected to the camera to receive and process only the image

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data associated with the region of interest segments (Neubauer: column 3, lines 61-67), wherein said camera further includes an image sensor including pixels for capturing the image and producing the image data corresponding to the image (Neubauer: column 6, lines 1-15); a memory storing selected ones of the pixels located in the region of interest segments within the image (Neubauer: column 3, lines 60-67); and an access controller configured to retrieve the image data associated with the selected pixels (Neubauer: column 4, lines 1-17), as in claim 18. However, Neubauer doesn't explicitly disclose the use of an ROI map as in the claims. But Neubauer discloses the use of ROI template generation based (Neubauer: column 4, lines 4-28) on ROI histograms (Neubauer: column 4, lines 60-67; column 5, lines 1-46) constructed from PCB marker identification (Neubauer: column 4, lines 37-50) in order to accurately predict and classify irregularly shaped PCB features with optimal results (Neubauer: column 7, lines 15-23), especially since the ROI histograms are evaluated on a global scale in accordance with Euclidean distance parameters corresponding to each respective marker (Neubauer: column 7, lines 55-67; column 8, lines 1-27). Accordingly, given the teaching of the Neubauer ROI histograms, it would have been obvious for one of ordinary skill in the art at the time of the invention to associate the ROI histograms of Neubauer with the claimed ROI maps of the instant invention in order to use said map associated ROI histograms to accurately predict and classify irregularly shaped PCB features with optimal results, especially since both would contain the spatial distribution of PCB markers across a field of view of the camera (Neubauer: column 7, lines 35-47). The Neubauer system, now incorporate the map associated ROI histograms as discussed above, has all of the features of claim 18.

Neubauer discloses method for imaging region of interest segments on a target surface (Neubauer: figures 6 and 9), comprising: capturing an image containing pixels (Neubauer: column 3, lines 55-57); storing selected ones of the pixels located in region of interest segments within the image (Neubauer: column 3, lines 58-67); and retrieving image data corresponding to the image and associated with the selected pixels (Neubauer: column 4, lines 1-29), as in claim 19. However, Neubauer doesn't explicitly disclose the use of an ROI map as in the claims. But Neubauer discloses the use of ROI template generation based (Neubauer: column 4, lines 4-28) on ROI histograms (Neubauer: column 4, lines 60-67; column 5, lines 1-46) constructed from PCB marker identification (Neubauer: column 4, lines 37-50) in order to accurately predict and classify irregularly shaped PCB features with optimal results (Neubauer: column 7, lines 15-23), especially since the ROI histograms are evaluated on a global scale in accordance with Euclidean distance parameters corresponding to each respective marker (Neubauer: column 7, lines 55-67; column 8, lines 1-27). Accordingly, given the teaching of the Neubauer ROI histograms, it would have been obvious for one of ordinary skill in the art at the time of the invention to associate the ROI histograms of Neubauer with the claimed ROI maps of the instant invention in order to use said map associated ROI histograms to accurately predict and classify irregularly shaped PCB features with optimal results, especially since both would contain the spatial distribution of PCB markers across a field of view of the camera (Neubauer: column 7, lines 35-47). The Neubauer method, now incorporate the map associated ROI histograms as discussed above, has all of the features of claim 19.

Regarding claim 20, the Neubauer method, now incorporate the map associated ROI histograms as discussed above, has wherein said retrieving further comprises: storing the image

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data corresponding to the image (Neubauer: column 3, lines 60-65); and accessing the image data associated with the selected pixels (Neubauer: column 4, lines 5-15), as in the claim.

Regarding claim 21, the Neubauer method, now incorporate the map associated ROI histograms as discussed above, has wherein said retrieving further comprises: reading the image data associated with the selected pixels row-by-row (Neubauer: column 6, lines 1-15), as in the claim.

Regarding claim 22, the Neubauer method, now incorporate the map associated ROI histograms as discussed above, has a step wherein retrieving further comprises: reading the image data associated with the selected pixels pixel-by-pixel (Neubauer: column 8, lines 10-30), as in the claim.

Regarding claim 23, the Neubauer method, now incorporate the map associated ROI histograms as discussed above, has a step for further comprising: calculating a reset time for each row of the plurality of pixels based on the map (Neubauer: column 6, lines 40-67), as in the claim.

Regarding claim 24, the Neubauer method, now incorporate the map associated ROI histograms as discussed above, has a step further comprising: loading the map into a memory.

Regarding claim 25, the Neubauer method, now incorporate the map associated ROI histograms as discussed above, has a step for transmitting the image data associated with the selected pixels (Neubauer: column 3, lines 50-55), as in the claim.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 5-6 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Neubauer et al., (hereinafter referred to as “Neubauer”) in view of Burns et al., (hereinafter referred to as “Burns”).

Neubauer discloses a camera (Neubauer: figure 5), comprising: an image sensor including pixels for capturing an image (Neubauer: column 3, lines 55-57) having two or more region of interest segments and producing image data corresponding to the image (Neubauer: column 3, lines 58-63); a memory storing selected ones of the pixels located in the region of interest segments within the image (Neubauer: column 3, lines 64-67); and an access controller configured to retrieve the image data associated with the selected pixels (Neubauer: column 4, lines 1-3), as in claims 5-6 and 9-10. However, Neubauer doesn't explicitly disclose the use of an ROI map as in the claims. But Neubauer discloses the use of ROI template generation based (Neubauer: column 4, lines 4-28) on ROI histograms (Neubauer: column 4, lines 60-67; column 5, lines 1-46) constructed from PCB marker identification (Neubauer: column 4, lines 37-50) in order to accurately predict and classify irregularly shaped PCB features with optimal results (Neubauer: column 7, lines 15-23), especially since the ROI histograms are evaluated on a global scale in accordance with Euclidean distance parameters corresponding to each respective marker (Neubauer: column 7, lines 55-67; column 8, lines 1-27). Accordingly, given the teaching of the

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Neubauer ROI histograms, it would have been obvious for one of ordinary skill in the art at the time of the invention to associate the ROI histograms of Neubauer with the claimed ROI maps of the instant invention in order to use said map associated ROI histograms to accurately predict and classify irregularly shaped PCB features with optimal results, especially since both would contain the spatial distribution of PCB markers across a field of view of the camera (Neubauer: column 7, lines 35-47), as in the claims 5-6 and 9-10. However, Neubauer fails to disclose the specific use of CCDs or CMOS image sensors, as in the claims. Burns discloses the use of a machine vision application (Burns: column 1, lines 25-35) which discloses the advantageous use of both CCDs (Burns: column 2, lines 12-64) and CMOS image sensors (Burns: column 4, lines 25-40) as conventional imaging means in ASICs (Burns: column 5, lines 15-35) for efficiently processing ROI information in images (Burns: column 4, lines 45-67; column 5, lines 1-6 and 35-67). Accordingly, given this information, it would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate the Burns' teaching of using CCDs and CMOS imaging based sensors into the Neubauer camera in order to efficiently process ROI information in the Neubauer application for PCB images. The Neubauer camera, now incorporating the Burns teaching of using CCDs and CMOS image sensors, has all of the features of claims 5-6 and 9-10.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy S. Rao whose telephone number is (571)-272-7337. The examiner can normally be reached on Monday-Friday 8 hours.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571)-272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Andy S. Rao
Primary Examiner
Art Unit 2621

asr
August 19, 2007

